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TYPE STUDIES IN THE HYDNACEAE¹

II. THE GENUS STECCHERINUM

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The genus *Steccherinum* was established by S. F. Gray² on *Hydnum ochraceum* Pers. as the type. In Persoon's herbarium, now preserved in the University of Leyden, there is a specimen marked in what is believed to be Persoon's hand: "*Hydnum ochraceum* (junius? resupinatum) Prope Parisios." The specimen has been peeled from the substratum and glued tight to the sheet, hymenial surface down. It is nearly wholly resupinate, the margin being only slightly reflexed. In consistency of substance and character of teeth, so far as they could be made out, the specimen appeared to be identical with American plants commonly referred to this species.

As we have observed the plant in this country it presents a considerable degree of variation, from very thin sheets with slightly reflexed margins to much thicker layers with distinct prominent pilei. The typical form of the plant as suggested by Persoon's specimen and figure,³ as well as by Sowerby's figure of *Hydnum Daviesii*,⁴ believed to be a synonym, compared with our American plants most nearly like these, appears to be a thin, separable, membranous subiculum more or less reflexed at the margin into numerous thin flabelliform pilei. This typical form of the plant does not appear to be common with us and is usually found on the lower side of large prostrate limbs, spreading upward on the sides of the substratum until compelled to become reflexed to preserve the plagiotropic position of the hymenium. A more common form with us has a thicker subiculum and is usually found growing on the vertical side of standing trunks of various

¹ Investigation prosecuted with the aid of a grant from the Esther Herrman Research Fund of the New York Academy of Science.

² Nat. Arr. Brit. Pl. 1: 651. 1821.

³ Persoon, Syn. Meth. Fung. pl. 5. f. 5.

⁴ Sowerby, Eng. Fung. pl. 15.

deciduous trees, covering spots injured by fire or otherwise. The plant here grows spreading in a vertical position and forms numerous imbricated, campanulate, and often pendent pilei of considerable thickness. I have seen a quarter of an acre of young white oak twenty or twenty-five years old in which nearly every tree had a spot on one side near the ground and extending up the trunk for one or two feet bare of bark and covered with the sporophores of this plant. Whether the fungus had attacked the living tree and produced these decayed spots or whether the spots had been killed by other means and the fungus had taken possession could not be positively determined. But I think the latter was probably the case. It has seemed sometimes as though this form was a distinct species, but I have found fallen limbs of these same oaks on which the fungus developed too closely the characters of the typical *H. ochraceum* to warrant its being separated as a separate species.

***Steccherinum dichroum* (Pers.)**

Hydnum dichroum Pers. Myc. Eur. 2: 213. 1825.

Hydnum pudorinum Fries, Elench. 1: 133. 1828.

The only specimen in Persoon's herbarium throwing any light on this species was one sent to Persoon by Delastre marked "hydnum rubiginosum Dre" and renamed in Persoon's hand "Hydnum dichroum." As Persoon cites Delastre for his specimen, it is probable that this is the type specimen. In consistency and character of teeth the plant closely resembles *Steccherinum ochraceum*, but differs in its thicker subiculum and more flabelliform pilei. The plant perhaps approaches too near *S. Rhois* (Schw.) to be regarded as a distinct species. There is, however, a fairly well defined group of forms intermediate between *S. ochraceum* and *S. Rhois*, of which this specimen appears to be typical and which may, therefore, be regarded as constituting the species *S. dichroum* (Pers.).

At Upsala, specimens of similar character were referred uniformly to *Hydnum pudorinum* Fr. From the late date of most of these specimens it is improbable that they were ever seen by E. Fries. A single specimen (of older date) was found, apparently received from Delastre and marked in Delastre's hand

"hydnum rubiginosum Dre. 1823,—Dichroum Pers. Myc. Eur. sect. 2 add^d Pag. 213." Below this appeared in a different hand "pudorinum Fr." This plant differs considerably from the specimen in Persoon's herbarium, likewise received from Delastre, and approaches more nearly *S. ochraceum*. It is possibly the specimen to which Fries refers in "Hymenomycetes Europeae" 612. Fries himself regarded *Hydnum dichroum* Pers. as a synonym of his *H. pudorinum* and it seems best that the names should be regarded as synonyms, but the older name of Persoon has priority and the species should be known as *Steccherinum dichroum* (Pers.).

STECCHERINUM RHOIS (Schw.) Banker, Mem. Torrey
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Hydnum Rhois Schw. Syn. Fung. Car. Sup. 77. 1818.

Hydnum flabelliforme Berk. Lond. Jour. Bot. 4: 306. 1845.

The type of *H. Rhois* Schw. in the Schweinitz herbarium at Philadelphia has disappeared. In the Berkeley herbarium at Kew, England, a specimen was found marked "*Hydnum Rhois* L. v S. Herb. Schwein." and is presumably a part of the original Schweinitz specimen. This particular specimen is somewhat smaller than the type of *Hydnum flabelliforme* Berk. preserved in the same herbarium and approaches somewhat closely to *Steccherinum dichroum* (Pers.), but in most of its characters is essentially the same as *Hydnum flabelliforme* Berk. Comparison with extensive collections of our American forms convinces me that *H. Rhois* cannot be successfully separated from *H. flabelliforme*.

The entire series of forms included under these three species, *Steccherinum ochraceum* (Pers.), *S. dichroum* (Pers.), and *S. Rhois* (Schw.), constitute a closely continuous series in which over refinement of species making might be able to segregate some five or six more or less clearly defined forms. We believe, however, that the three species enumerated is as close a segregation as the group will bear and it may even be reasonably questioned whether these species are anything more than extreme variations of a single fundamental type. It seems to be possible to obtain an almost complete blending of the species by intermediate forms, some of which perhaps are really represented by

the synonyms. Thus *H. pudorinum* Fr. might be regarded as a form intermediate between *H. ochraceum* Pers. and *H. dichroum* Pers., while *H. Rhois* Schw. strictly interpreted is perhaps intermediate between *H. dichroum* Pers. and *H. flabelliforme* Berk.

***Steccherinum rawakense* (Pers.)**

Hydnum rawakense Pers. Freyc. Voy. Aut. du Monf. Bot. 175. 1826.

Hydnum reniforme Berk. & Curt. Jour. Linn. Soc. 10: 325. 1869.

Hydnum glabrescens Berk. & Rav. Grev. 1: 97. 1873.

Hydnum guaraniticum Speg. Fung. Guar. 34. 1883.

Hydnum basi-asperatum Henn. Hedw. 36: 199. 1897.

No type of *H. rawakense* Pers. was found in Persoon's herbarium at Leyden, but in the Herbarium of Paris there was found a specimen with the following label apparently in Persoon's hand; "37 hydnum rawakense Rawak. C. Sandrenaud," and then there was added in a different hand "spec. Persoonianum." The specimen would appear to be in all probability the type of the species. It is discolored as though it had some time been poisoned, and has evidently been formerly glued to a sheet teeth down, the teeth being gummed up with the glue.⁵ In spite of these deformities, there appears to be but one group of forms to which it could belong, a species that ranges from the West Indies through South America and the islands of the Southern Pacific. The most distinctive features of the species are the thin, submembranous, spreading pilei, the pubescent, ochraceous surface with a somewhat clearly marked central or basal disk and a broad marginal portion marked with more or less distinct light and dark zones. At Berlin specimens of this species were noted from Brazil and from New Guinea, the latter having the margin distinctly lobed.

The type of *H. reniforme* B. & C. is in the Berkeley herbarium at Kew and is marked "301 Hydnum reniforme Bk. Cuba, Wright, (Curtis)." It appears to be unquestionably the same thing as *H. rawakense* Pers. The specimen at Kew, "Ravenel No. 1634," the type of *H. glabrescens*, appears to me to be prob-

⁵ In Persoon's herbarium several specimens were observed mounted in this unusual manner. See *S. ochraceum*.

ably this same species, but is not quite typical, having a thicker pileus, and is a little darker colored.

At Paris a specimen was found evidently distributed by Spegazzini as an authentic specimen of his *H. guaraniticum* from Paraguay, June, 1883. The plant appeared to have all the characters of *H. rawakense* Pers.

The type of *H. basi-asperatum* Henn. is in the Berlin herbarium, Germany, and was collected by E. Ule in Brazil, No. 743. The plant has precisely the texture, color, and tooth characters of *Steccherinum rawakense* Pers. It appears to have been a plant that when half grown had been turned over so as to bring the hymenial side upward and had then proliferated a series of confluent pilei from its margin, giving the margin a lobed appearance. The hymenial layer of these new growths has spread back over what was the upper surface of the old pileus, forming a continuous layer which is interrupted, however, at one point where the characters of the upper surface of the old pileus are revealed. The teeth on the old lower surface now exposed upward have become darkened and appear weathered somewhat, but are still distinctly teeth and not hairs or tomentum. With this explanation the plant is identical with Moller's specimens in the same herbarium mentioned by Hennings in his original description. This curious mare's-nest is figured true to the specimen in Engler und Prantle, Die natürl. Pflanzenf. I. 1**: 145. f. 77. c-e.

***Steccherinum pusillum* (Brot.)**

Hydnum pusillum Brot. Fl. Lus. 2: 470. 1804.

Steccherinum adustulum Banker, Mem. Torrey Club 12: 133. 1906.

The type of *H. pusillum* Brot. is probably not in existence. At both Kew and Upsala were found specimens from Quélet referred in some cases to *Hydnum pusillum* Fr., in others to *H. pusillum* Quél. and at Upsala the sheet itself was marked "*Hydnum pusillum* Brot." All of these specimens were undoubtedly the same as my *Steccherinum adustulum*. The species is, therefore, a European form as well as American, and Brotero's description so well fits the characters of the plant as we know it that there seems to be no reasonable doubt that his name should prevail for this species.

Steccherinum Peckii sp. nov.

Hymenophore pileate narrowing into a lateral stipe; pileus flabelliform, horizontal, confluent laterally, 0.5–1 cm. wide, by confluence often 3 cm. wide, 0.5–1.5 cm. long, thin, less than 1 mm. thick; surface glabrous or slightly puberulent, radiately rugose, subsulcate-zonate, light-buff, concentrically zonate with fine dark lines; margin thin, subrepand; substance fibrous, dry, brittle; stipe lateral, more or less compressed vertically, attenuate to base, usually distinct, occasionally confluent, concolorous with pileus, 1–8 mm. long by 1–5 mm. wide; hymenium ochraceous, more or less sharply delimited toward the stipe; teeth crowded, short, often decurrent as papillae on the stipe, ochraceous to buff, terete to compressed, sometimes forked, whitish-puberulent with free clavate hyphal ends, 1–2 mm. long, 9–12 to a sq. mm.; spores elliptical or oblong, smooth, hyaline, granular, $2\text{--}2.5 \times 3\text{--}3.5 \mu$; hyphae hyaline, firm-walled, elastic, compactly woven, infrequently septate; tasteless; odorless.

On dead maple limbs in autumn at Griffin's Corners, Delaware County, N. Y. Collected by C. H. Peck.

Type in the writer's herbarium and in the New York State herbarium at Albany, N. Y.

This elegant species is closely related to *Steccherinum Rhois* (Schw.), from which it is clearly distinguished by the nearly or quite glabrous surface of the pileus and by the sharply defined, concentric, dark lines. The surface has a somewhat silky lustre and this with the color markings and the graceful, clearly defined form of the pileus renders the species especially attractive. I take pleasure in dedicating this handsome species to the collector, our mycological Nestor, Dr. C. H. Peck, State Botanist of New York.

Steccherinum basi-badium sp. nov.

Hymenophore pileate, sessile to substipitate, somewhat confluent; pileus dimidiate to orbicular, horizontal or ascending, 0.5–1.5 cm. wide, 0.5–1 cm. long, 0.2–0.3 mm. thick; surface sulcate-zonate, radiately subrugose, glabrous, light-buff at margin, becoming abruptly darker, umbrinous to badious toward base; margin very thin, acute, substerile, incurved; substance fibrous, dry, scarcely brittle, buff to ochraceous below, badious above; teeth crowded, delicate, slender, subterete to compressed, tips minutely forked or fimbriate, 0.3–0.5 mm. long \times 0.1 mm. wide, pale-buff to ochraceous, puberulent with free clavate hyphal ends; spores not

observed; hyphae hyaline, firm-walled, elastic, infrequently septate, clamp-connections occasional, not easily separable in KOH; tasteless; odorless.

Mexico. Collected by W. A. Murrill.

Type (Murrill 253) in the New York Botanical Garden.

The species appears to be closely related to *Hydnum rawakense* Pers. and *S. Peckii*, but is more delicate, with a thinner pileus, and is clearly distinguished by the dark brown disk and base.

STECCHERINUM MORGANI Banker, Mem. Torrey Club 12:

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As has already been stated, the type of *Hydnum glabrescens* Berk. & Rav. is No. 1634 Ravenel, with which Berkeley also associated No. 385 Thwaites. These specimens are preserved in the Berkeley herbarium at Kew, England. No. 1634 has every appearance of being *Steccherinum rawakense* (Pers.), q. v., but is not quite typical. No. 385 is simply marked "385 *Hydnum glabrescens* B. & Rav." and is without any date or locality indicated. The specimen is badly worm-eaten and a mere scrap, but does not appear much like No. 1634. It does resemble another specimen in the herbarium marked "*Hydnum glabrescens* B. & R." in Berkeley's hand. To this specimen is attached a slip with the following memorandum: "A form apparently of no. 385 sent before. *Hydnum* Central Province Dec. 1868," probably a note by Thwaites. This specimen is also in poor condition. A third specimen with these has no name attached, but is marked "Ceylon 1866 G. H. K. T." This specimen is in much better condition than the others and strikingly resembles the plants that I described as *Steccherinum Morgani* loc. cit. from specimens collected by A. P. Morgan in Ohio.

These three specimens so far as can be judged are apparently all one species and were probably all collected by Thwaites in Ceylon. On the testimony chiefly of the last specimen they seem to approach closely to the Morgan plants, yet the specimens were too poor to draw positive conclusions. In the Cooke Herbarium, also now preserved at Kew, was found a specimen marked simply "*Hyd. glabrescens* B. & R. Ceylon." This was so perfectly identical with the Morgan plants in every way that it seemed not

only that it was the same species but must have been collected under precisely the same conditions, in fact, it appeared to be part of the same collection. It seemed impossible that plants not known to be cosmopolitan could have developed in regions so remote and of so different environmental conditions as in Ceylon and Ohio and have produced such perfect identity of characters. Two plants could not possibly be any more perfectly alike. Knowing that Cooke had received some of Morgan's specimens, it seemed too probable that there had been an error in labeling and that the specimen should have been marked Ohio instead of Ceylon. Later, however, at South Kensington in the Broome Herbarium there was found a specimen just as perfectly identical with the Morgan specimens as was the Cooke specimen and this was marked "Hydnum Ceylon. G. H. T. 1854." There appeared to be no reason to doubt that this was truly a Ceylon plant and hence that the Cooke specimen was also correctly labeled. It seems, therefore, conclusively demonstrated that plants identical in every respect with the type of *Steccherinum Morgani* were collected in Ceylon by G. H. K. Thwaites between 1854 and 1868, and that No. 385 is in all probability one of these plants.

The South Carolina plant of Ravenel, No. 1634, does not belong to this species. It is also evident that Berkeley had the Ravenel plant in mind as the type of his *H. glabrescens* not only from the fact of his having described the species in a work on North American fungi, but also from the fact that when he placed any name on the Ceylon plants it was with the ascription "B. & Rav." or "B. & R." It seems clear, therefore, that the name was first given to the American plant and the Ceylon specimens were then referred to this species, as we believe, erroneously.

***Steccherinum laeticolor* (Berk. & Curt.)**

Hydnum laeticolor Berk. & Curt. Grev. 1: 99. 1873.

The type of this species according to the citation of Berkeley is Curtis 2930, with which are associated other specimens from the South, as Beaumont 4647, 5166, and Ravenel 894. These specimens are all in the Berkeley Herbarium at Kew. The species as thus represented is a clearly defined segregation some-

what resembling *Steccherinum ochraceum* (Pers.) in general appearance, but readily distinguished by its soft spongy or almost cotton-like substance and its pronounced reddish color when young and fresh, but this color fades out considerably with age and weathering. There seems to have been no confusion respecting the species and it is correctly represented in the Exsiccati of Ravenel, Fung. Car. Exsicc. 3: 18; and Ellis and Everhart, N. Am. Fung. 2nd Series, 2015. The species appears to be confined wholly to the southern states.

***Steccherinum multifidum* (Kl.)**

Thelephora multifida Kl. Linnaea 25: 365. 1852.

Hydnum plumarium Berk. & Curt. Jour. Linn. Soc. 10: 324. 1869. Not *H. plumarium* Berk. & Curt. Grev. 1: 97. 1873.

There is reason for some doubt as to whether this species should be included in the genus *Steccherinum* or not. It does not appear to have closer affinities with any other genus and if removed would have to be erected into a genus by itself. The principal departure from the generic type is in the character of the hymenial surface, which consists of poorly developed but closely anastomosing ridges more or less cut up into flattened, conical, or cylindrical teeth. In this respect the plant shows some affinity to the genus *Phlebia* and in places the anastomosition becomes so close as to form alveolar pores, suggesting a close relationship to *Favolus* of the Polyporaceae.

The type of *Thelephora multifida* Kl. is preserved in the Berlin herbarium and is marked "No. 14c. Thelephora (Merisma) multifida Kl. Portorico. Schwanecke." The specimen has the hymenial ridges and teeth so more than usually poorly developed as to be scarcely noticeable, hence the plant was referred to *Thelephora*. The teeth, however, are present in places, and Hennings recognizing them referred the specimen to *Hydnum*.

The type of *Hydnum plumarium* B. & C., Jour. Linn. Soc. 10: 324, is given by Berkeley as "205". Cuban Fungi. In the Berkeley herbarium at Kew, the specimen is marked "205 Hydnum plumosum B. & C., Cuba, Wright (Curtis)." It is an excellent specimen of the same species as *Thelephora multifida* Kl. It is entirely distinct from *Hydnum plumarium* B. & C., Grev. 1:

97, as may be determined by comparison of the descriptions, and is confirmed by the types at Kew.

The study of numerous specimens of *Steccherinum multifidum* (Kl.) at Berlin, Kew, New York Botanical Garden, and in the writer's herbarium show the plant to vary considerably in the degree of development of the hymenial ridges and teeth, and always there is more or less interruption in the extent of these features, so that many parts of the hymenial surface appear nearly smooth. The margin of the pileus also varies greatly from barely fimbriate to deeply laciniate.

The plant appears to be of fairly common occurrence but is confined to the region of the West Indies.

DOUBTFUL SPECIES

HYDNUM DECURRENS B. & C., according to Berkeley, is based on plants collected by Wright in Cuba and sent to Berkeley by Curtis, Nos. 234 and 297. The specimens are at Kew and No. 234 is a fragment of little value. No. 297 is a good complete specimen identical in every respect with specimens distributed in "Fungi Cubenses Wrightiani," No. 346, as "*Hydnum decurrens*." The plants appear to be too near *Steccherinum ochraceum* (Pers.).

HYDNUM PLUMARIUM Berk. & Curt. Grev. 1: 97. 1873. Not *H. plumarium* Berk. & Curt., Jour. Linn. Soc. 10: 324. 1869. The type according to the citations of Berkeley is "4936 Car. Sup." The specimen at Kew marked "4936 *Hydnum plumarium* B. & C. Car. Sup. on *Viburnum*" appears to be a pale, perhaps weathered, specimen of *Steccherinum laeticolor* B. & C., but the material is too scanty to be of much value.

HYDNUM CONCHIFORME Sacc. Syll. Fung. 6: 458. 1888, was proposed as a substitute for *Hydnum plumarium* B. & C. above and hence is based on the same material as type.

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